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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,511	04/03/2006	Raphael Salot	127579	6980

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EXAMINER	
CULLEN, SEAN P	
ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
06/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/574,511	SALOT ET AL.	
	Examiner	Art Unit	
	Sean P. Cullen	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *24,27,32,33 and 40-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *24,27,32,33 and 40-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 7, 2010 has been entered.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 24, 27, 32 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Ugaji et al. (U.S. 2003/0175585).

Regarding claim 1, Ugaji et al. discloses a microbattery (Fig. 3) comprising

- a first electrode (32) formed as a thin layer (Fig. 3, [0120] and [0134]),
- the first electrode (32) consisting of a first active compound $A_{x1}T_{y1}[PO_4]_{z1}B_{w1}$, (see lithium cobaltate and lithium phosphate, [0134]) in which a chemical element E (see electron conductive material, [0134]) selected from the group consisting of metals and carbon is dispersed in the first active compound (see platinum, [0134]),
- a second electrode (35) formed as a thin layer (Fig. 3),

- the second electrode (35) consisting of a second active compound $A_{x2}T'_{y2}[PO_4]_{z2}B'_{w2}$, (see lithium, [0125]; lithium phosphate, [0134] and [0160]) in which a chemical element E' (see electron conductive material, [0134]) selected from the group consisting of metals and carbon is dispersed in the second active compound (see platinum, [0134] and [0160]), and
- wherein A in the first active compound and the second active compound is a same or different alkaline metal ion selected from the group consisting of lithium and sodium (see lithium [0089], [0125] and [0134]),
- wherein T in the first active compound and T' in the second active compound are each a same or different mixture of metallic ions comprising at least one transition metal ion selected from the group consisting of titanium, vanadium, chromium, cobalt, nickel, manganese, iron, copper, niobium, molybdenum and tungsten (see cobalt, [0073], [0089] and [0134]),
- wherein B in the first active compound and B' in the second active compound are each a same or different chemical element selected from the group consisting of sulphur, oxygen, fluorine and chlorine ([0073] and [0089]),
- wherein x_1 and $w_1 \geq 0$ and y_1 and $z_1 > 0$ and x_2 and $w_2 \geq 0$ and y_2 and $z_2 > 0$ ([0073],[0089], [0125], [0134] and [0160]),
- a solid electrolyte (34) disposed between the first electrode (32) and the second electrode (35, Fig. 3),
- the solid electrolyte (34) being formed as a thin layer (Fig. 3) consisting of a compound comprising at least a $[PO_4]$ grouping (see lithium phosphate, [0123]),

- wherein the first electrode (32) and the second electrode (35) have different intercalation potentials of the alkaline metal ion A ([0073], [0089], [0125], [0134] and [0160]).

Regarding claim 27, Ugaji et al. discloses all claim limitations set forth above and further discloses a microbattery:

- wherein the electrolyte (34) comprises nitrogen (see LIPON, [0086]).

Regarding claim 32, Ugaji et al. discloses all claim limitations set forth above and further discloses a microbattery:

- wherein T and T' are identical (see cobalt, [0073] and [0089]).

Regarding claim 33, Ugaji et al. discloses all claim limitations set forth above and further discloses a microbattery:

- wherein E and E' are identical (see platinum, [0134] and [0160]).

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ugaji et al. (U.S. 2003/0175585).

Regarding claim 42, Ugaji et al. discloses a method for production of a microbattery according to claim 24 ([0073], [0089], [0120], [0125], [0134] and [0160]), consisting of successively depositing on a substrate (30):

- a first thin layer (32) forming the second electrode (32) by means of a first and second sputtering targets consisting of the compound $A_{x2}T'_{y2}[PO_4]_{z2}B'_{w2}$ (see lithium cobaltate and lithium phosphate, [0134]) and the chemical element E' (see platinum, [0134]),
- a second thin layer (34) forming the electrolyte (34) by means of a third sputtering target comprising at least the $[PO_4]$ grouping (see lithium phosphate, [0123]), and
- a third thin layer (35) forming the first electrode (35) by means of a fourth and fifth sputtering target consisting of at least the grouping $A_{x1}T_{y1}[PO_4]_{z1}B_{w1}$ (see lithium, [0125]; lithium phosphate, [0134] and [0160]) and the chemical element E (see platinum, [0134] and [0160]).

Ugaji et al. does not explicitly disclose:

- wherein the first and second sputtering targets are a single sputtering target.
- wherein the fourth and fifth sputtering targets are a single sputtering target.

With respect to claim 42, as instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the first and second sputtering targets and the fourth and fifth sputtering targets of Ugaji et al., since such modification would have involved making elements integral. Making elements integral is generally recognized as being within the level of ordinary skill in the art. *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

Regarding claim 45, modified Ugaji et al. discloses all claim limitations set forth above and further discloses a method for production of a microbattery:

- wherein the electrolyte is deposited in the presence of gaseous nitrogen (see LIPON, [0086]).

6. Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ugaji et al. (U.S. 2003/0175585) as applied to claim 42 above, and further in view of Bates et al. (U.S. 5,597,660).

Regarding claim 46, modified Ugaji et al. discloses all claim limitations set forth above and further discloses a method for production of a microbattery:

- wherein a first current collectors (31) is deposited on the substrate (30), by cathode sputtering, before deposition of the second electrode (32, [0118]).
- wherein a second current collector (36) is deposited on the substrate (30), by cathode sputtering [0127].

Ugaji et al. does not explicitly disclose:

- wherein a second current collector is deposited before deposition of the second electrode

A current collector can have a variety of configurations, including being deposited before deposition of a second electrode (as evidenced by Bates et al.). The change in configuration of a device is obvious absent persuasive evidence that the particular configuration is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the second current collector of Ugaji et al. to include a variety of configurations, as taught by Bates et al. An ordinary skilled artisan at the time of the invention would have been motivated to do the foregoing in order to optimize the thickness of the microbattery.

7. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ugaji et al. (U.S. 2003/0175585) as applied to claim 24 above, and further in view of Hashimoto et al. (U.S. 6,287,716).

Regarding claim 40, Ugaji et al. discloses all claim limitations set forth above, but does not explicitly disclose a microbattery:

- wherein a first intermediate thin layer comprising the respective constituents of the first electrode and of the electrolyte is arranged between the first electrode and the electrolyte,
- the concentrations of the constituents of the first electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the first electrode.

Hashimoto et al. discloses an electrode-electrolyte assembly wherein a first intermediate thin layer (see intermediate layer, C4/L27-40) comprising the respective constituents of a first electrode (C4/L27-40) and of constituents of a electrolyte (C4/L27-40) is arranged between the first electrode and the electrolyte (C8/L38-45), the concentrations of the constituents of the first electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the first electrode (C7/L58-64) in order for the composition between each interface to change continuously (abstract) to reduce the interface resistance between the electrode and electrolyte (C8/L32-36). Ugaji et al. and Hashimoto et al. are analogous art because they are directed to reducing the resistance in electrolyte-electrode assemblies. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention to make the microbattery of Ugaji et al. with an intermediate layer as taught by Hashimoto et al. to reduce the interface resistance between the electrode and electrolyte.

Regarding claim 41, Ugaji et al. discloses all claim limitations set forth above, but does not explicitly disclose a microbattery:

- wherein a second intermediate thin layer comprising the respective constituents of the second electrode and of the electrolyte is arranged between the second electrode and the electrolyte,
- the concentrations of the constituents of the second electrode and of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the second electrode.

Hashimoto et al. discloses an electrode-electrolyte assembly wherein a second intermediate thin layer (see intermediate layer, C4/L27-40) comprising the respective constituents of a second electrode (C4/L27-40) and of constituents of a electrolyte (C4/L27-40) is arranged between the second electrode and the electrolyte (C8/L38-45), the concentrations of the constituents of the second electrode and of constituents of the electrolyte varying respectively from 0 to 1 and from 1 to 0, from the electrolyte to the second electrode (C7/L58-64) in order for the composition between each interface to change continuously (abstract) to reduce the interface resistance between the electrode and electrolyte (C8/L32-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the microbattery of Ugaji et al. with an intermediate layer as taught by Hashimoto et al. to reduce the interface resistance between the electrode and electrolyte.

8. Claims 43 and 44 rejected under 35 U.S.C. 103(a) as being unpatentable over Ugaji et al. (U.S. 2003/0175585) as applied to claim 42 above, and further in view of Hashimoto et al. (U.S. 6,287,716) and Lin et al. (U.S. 2005/0280118).

Regarding claims 43 and 44, Ugaji et al. discloses all claim limitations set forth above, but does not explicitly disclose a method for production of a microbattery:

- a first and second intermediate layer

Hashimoto et al. discloses an electrode-electrolyte assembly comprising a first and second intermediate thin layer (see intermediate layer, C4/L27-40) in order for the composition between each interface to change continuously (abstract) to reduce the interface resistance between the electrode and electrolyte (C8/L32-36). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the microbattery of Ugaji et al. with an intermediate layer as taught by Hashimoto et al. to reduce the interface resistance between the electrode and electrolyte.

Modified Ugaji et al. does not explicitly disclose:

- wherein a first intermediate thin layer is deposited on the second electrode by means of the first and second sputtering targets before deposition of the electrolyte.
- wherein a second intermediate thin layer is deposited on the electrolyte by means of the second and third sputtering targets before deposition of the first electrode.

Lin et al. discloses a method of production for producing a concentration gradient in a layer using first and second sputtering targets [0062]. Ugaji et al. and Lin et al. are analogous art because they are directed to the manufacture of multilayer film structures using the successive

deposition of each layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the microbattery of modified Ugaji et al. with method of Lin et al. to form a concentration gradient in an intermediate layer to reduce the interface resistance between the electrode and electrolyte.

9. Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ugaji et al. (U.S. 2003/0175585) as applied to claim 42 above, and further in view of Ravet et al. (U.S. 2002/0195591).

Regarding claim 47, Ugaji et al. discloses all claim limitations set forth above and further discloses a method for production of a microbattery:

- wherein the first and second sputtering target consists of $LiPO_4$ (see lithium, [0125]; lithium phosphate, [0134] and [0160]), in which is inserted platinum (see platinum, [0134] and [0160]),
- the third sputtering target consists of Li_3PO_4 (see lithium phosphate, [0123]), and
- the fourth and fifth sputtering target consists of $LiCoPO_4$ (see lithium cobaltate and lithium phosphate, [0134]), in which is inserted platinum (see platinum, [0134] and [0159]).

Ugaji et al. does not explicitly disclose:

- wherein the first and second sputtering targets are a single sputtering target.
- wherein the fourth and fifth sputtering targets are a single sputtering target.

With respect to claim 42, as instant specification is silent to unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

combine the first and second sputtering targets and the fourth and fifth sputtering targets of Ugaji et al., since such modification would have involved making elements integral. Making elements integral is generally recognized as being within the level of ordinary skill in the art. *In re Larson*, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965).

Modified Ugaji et al. does not explicitly disclose:

- wherein the first sputtering target consists of $LiFePO_4$.

Ravet et al. discloses an electrode comprising $LiFePO_4$ [0055] to modulate the redox potential of the transition elements [0025]. Ugaji et al. and Ravet et al. are analogous art because they are directed to lithium containing electrochemical cells. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the microbattery of modified Ugaji et al. with the electrode material of Ravet et al. to modulate the redox potential of the transition element.

Regarding claim 48, Ugaji et al. discloses microbattery (Fig. 3) comprising:

- a first electrode (35) formed by a thin layer (Fig. 3) consisting of
    - the active compound $LiPO_4$ (see lithium, [0125]; lithium phosphate, [0134] and [0160]), in which is inserted platinum (see platinum, [0134] and [0160]),
- a second electrode (32) formed by a thin layer (Fig. 3) consisting of
    - the active compound $LiCoPO_4$ (see lithium cobaltate and lithium phosphate, [0134]), in which is inserted platinum (see platinum, [0134]), and
- a solid electrolyte (34) formed by a thin layer (Fig. 3) consisting of

- Li_3PO_4 (see lithium phosphate, [0123]),

- the solid electrolyte (34) being disposed between the first electrode (35) and the second electrode (32, Fig. 3).

Ugaji et al. does not explicitly disclose:

- a first electrode consists of $LiFePO_4$.

Ravet et al. discloses an electrode comprising $LiFePO_4$ [0055] to modulate the redox potential of the transition elements [0025]. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make the microbattery of modified Ugaji et al. with the electrode material of Ravet et al. to modulate the redox potential of the transition element.

Response to Arguments

10. Applicant's arguments with respect to claims 24,27,32,33 and 40-48 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sean P. Cullen whose telephone number is 571-270-1251. The examiner can normally be reached on Monday thru Thursday 6:30 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Basia Ridley can be reached on 571-272-1453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. P. C./
Examiner, Art Unit 1795

/Basia Ridley/
Supervisory Patent Examiner, Art Unit 1795